Homework 1

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ex1)
We assume that in this Neural Network that there is a hidden layer and an output layer. The Hidden layer will contain 2 nodes used to get a preactivation values. The ReLU will be used to get the representation of
ex4)

	X_1	X_2	Y
a_0	-1	-1	-1
a_1	1	1	-1
a_2	1	-1	1
a_3	-1	1	1

(1)

The Starting $\vec{w}$ is $\{0, 0\}$ with an $\alpha = 1$
Step 1)

$$\begin{aligned} \vec{w}_1 &= \vec{w}_0 + \alpha * (-1) * a_0 \\ &= \{1, 1\} \end{aligned} \tag{1}$$

Step 2)

$$\begin{aligned} \vec{w}_2 &= \vec{w}_1 + \alpha * (-1) * a_1 \\ &= \{2, 2\} \end{aligned} \tag{1}$$

Step 3)

$$\begin{aligned} \vec{w}_3 &= \vec{w}_2 + \alpha * (1) * a_2 \\ &= \{3, 1\} \end{aligned} \tag{3}$$

Step 4)

$$\begin{aligned} \vec{w}_4 &= \vec{w}_3 + \alpha * (1) * a_3 \\ &= \{2, 2\} \end{aligned} \tag{4}$$

After a few Cycles, we see that it will not converge at all. This is because these points can not be linearly seperated